

(When Filled In)

997065

R & D CATALOG FORM			DATE 5 January 1965	
1. PROJECT TITLE/CODE NAME Improved Rear-Projection Screen		2. SHORT PROJECT DESCRIPTION Development of a rear-projection screen material with improved performance in reflectance, uniform dispersion and back-scattering.		
3. CONTRACTOR NAME NA		4. LOCATION OF CONTRACTOR NA		
5. CLASS OF CONTRACTOR NA		6. TYPE OF CONTRACT NA		
7. FUNDS FY 1965		8. REQUISITION NO. NA		9. BUDGET PROJECT NO. NP-V-14 25X1
FY 19 \$		10. EFFECTIVE CONTRACT DATE (Begin - end) June 1965 - December 1965		11. SECURITY CLASS. A. A. - Conf. T - Unclass. W - Unclass.
FY 19 \$				
12. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION DDI/NPIC/P&DS/ 25X1				
13. REQUIREMENT/AUTHORITY This development will achieve a higher screen efficiency than current rear-projection screens. An improved screen will not restrict the photo-interpreter by the information transfer limitations of the screen. A development of this type is needed by NPIC/PAG and NPIC/PID.				
14. TYPE OF WORK TO BE DONE Applied Research				
15. CATEGORIES OF EFFORT				
MAJOR CATEGORY		SUB-CATEGORIES		
Visuals and Other Interpretation Equipment		Interpretation/Analysis		
		Photo Reconnaissance		
		Visual		
16. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC. Final Report and a breadboard/The improved screen would minimize the degrading effects of dispersion, diffraction, back-scattering and reflection of ambient light.				
17. SUPPORTING OR RELATED CONTRACTS (Agency & Other)/COORDINATION Due to contacts throughout industry and the intelligence community, it has been determined that no equivalent development is being made.				
18. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT (Continue on additional page if required) Because a rear-projection screen has a very low efficiency, much of the projected illumination is lost. This loss of illumination requires higher illumination levels to be projected through the film thereby causing overheating. If the screen could be improved, less illumination would be required. The present screens have several objectionable characteristics: 1. Cause dispersion and diffraction, thereby introducing color and graininess. 2. Back-scatter as much as 50% of the incident illumination, thereby reducing efficiency.				
19. APPROVED BY AND DATE				
OFFICE	DEPUTY DIRECTOR		DDCI	

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18. 3. Reflect a high percentage of ambient light and internally reflect a considerable portion of the dispersed projection light -- both effects significantly diminish contrast.

A rear-projection screen should be developed which would significantly minimize these degrading effects.

Developments which would alleviate all the limitations described above are required; at the same time, attention must be given to the following:

- a. Resolution must be comparable to that of existing screens.
- b. Size as large as 30" x 30" must be feasible.
- c. Economy must be consistent with that of typical rear-projection viewers.

The screen will have the following desirable characteristics:

1. The screen should reproduce or transmit an image with minimum color contribution and graininess. Appearance approaching that of the virtual image in a direct-viewing optical system is the goal.

2. Conventional light-scattering screens exhibit mutually exclusive properties of axial gain and angular gain. To increase angular gain (luminance), more scattering is required; and this, in turn, decreases axial gain. More important, this also increases back-scattering and reduces efficiency. Consequently, it is required that the improved screen display relatively uniform luminance ($\pm 15\%$) over a solid angle of 90° centered on the axial ray with less than 15% back-scattering.

3. The primary property which degrades contrast in conventional screens is internal and external reflectance. The improved screen should minimize this property. A reflectance characteristic approaching that of black velvet is ideal.

In an ambient light level of 5 foot-lamberts and an incident signal intensity range of 2000 to 1, the improved screen should display a brightness range of 1000 to 1.

4. The improved screen should exhibit a resolution of 10 lines per mm at 90% modulation transfer function: The desired goal is 20 lines per millimeter at 90% MTF.